

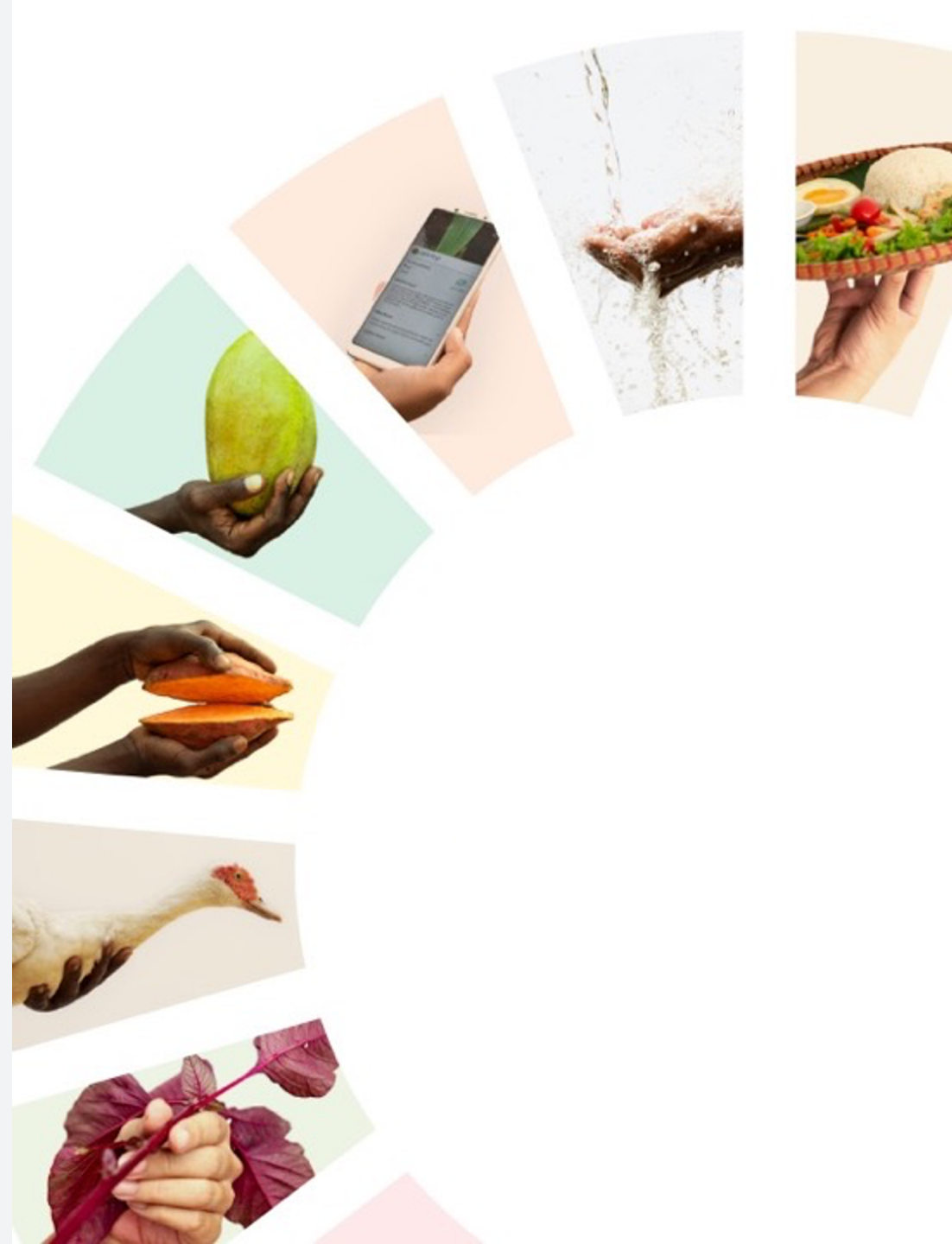


# Sustainable Intensification of Mixed Farming Systems (SI-MFS)

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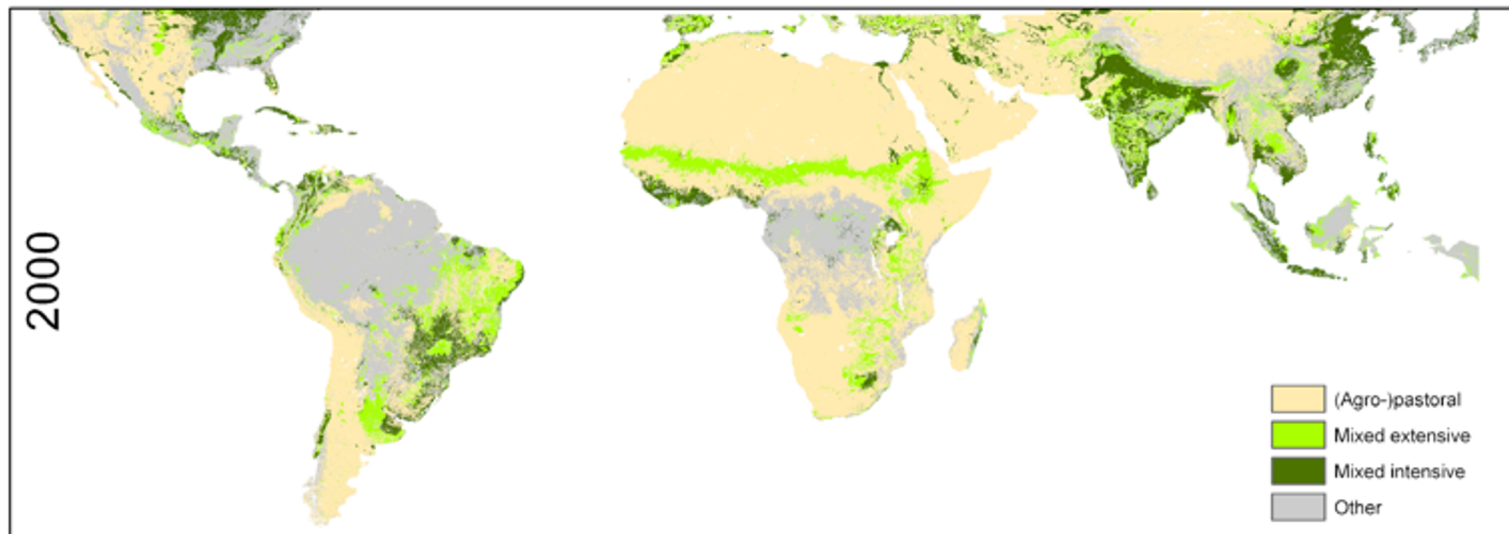
*Santiago Lopez Ridaura, CIMMYT*



## Research challenge

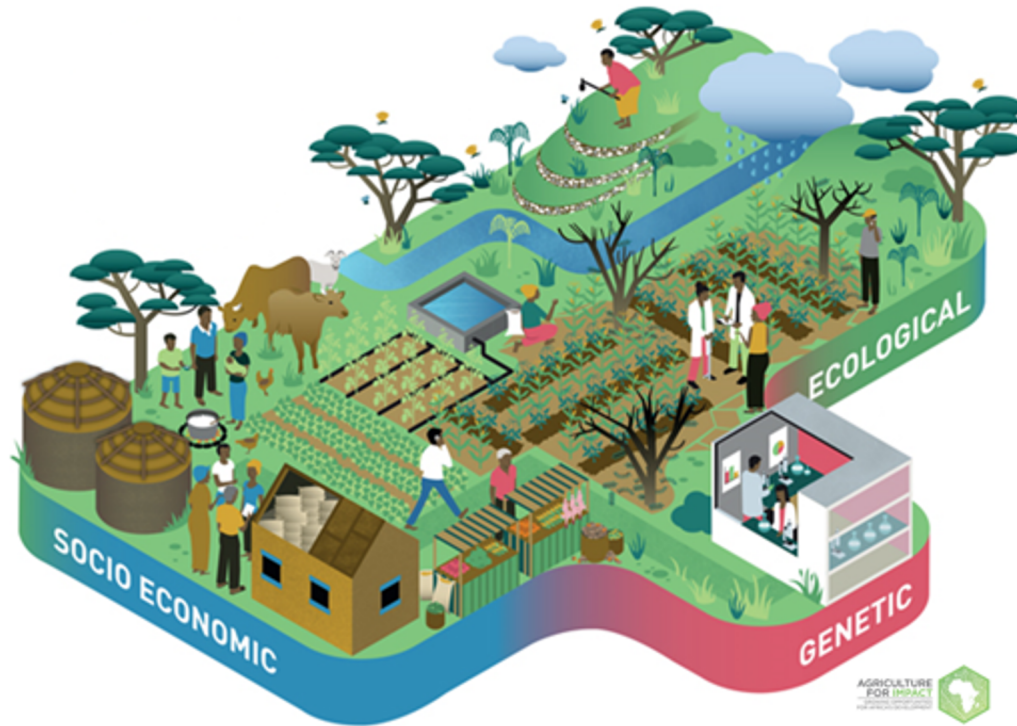
Most agricultural production in the global south happens in **Mixed Farming Systems (MFS)**.

- Mixed crop-livestock systems are considered to cover 2.5 billion Ha of land globally and, in the Tropics, they supply around 75% of the milk, 60% of the meat and between 40 and 86 % of the maize, rice, sorghum and millet consumed (Thornton et al 2017).



# Research challenge

- Most agricultural R&D has been “component-focused” which often limits scaling and the potential for impact at scale and amplifies trade-offs between livelihood objectives of MFS actors.



## Sustainable Intensification of MFS

- Integrates genetic, ecological, and socio-economic innovations & information
- Increases productivity per unit land, labor, capital, etc.
- Considers whole-farm & household issues
- Ensures efficient, prudent use of inputs
- Conserves or enhances natural resources
- Increases resilience, equity & reduces risks

**‘Livelihood lens’ considers socio-economic, nutritional & cultural conditions**

# The SI-MFS Initiative can deliver critical outcomes that result in multiple impact at scale, minimize sectoral trade-offs and leverage/maximize synergies in MFS

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## Objectives (2022-2024)

- To improve overall systems productivity and reduce environmental footprint of MFS through better resource use efficiency (i.e., 15% increase productivity covering over 10 million ha and benefiting 15 million men and women sub-Saharan and Northern Africa, South and Southeast Asia, and Latin America)
- To provide equitable, transformative pathways for improved livelihoods for MFS actors through SI in target agro-ecologies and socio-economic settings
- To mainstream co-development and application of systems analysis and design tools with R&D partners (i.e., multi-criteria assessment, targeting innovations, trade-off analysis)
- To institutionalize systems thinking for SI within innovations systems and R&D programs led by CGIAR, NARES, local universities and international partners



# 5 work packages



## WP 1: Regional and global status, trends and dynamics of MFS

This WP **analyses status, trends, required adaptations and entry points** in MFS in CGIAR regions to **improve livelihoods**.



## WP 2: Building methods and tools (M&T) for SI of MFS

This WP **develops, adapts, and applies new and existing M&T** for the analysis of current MFS and the **design of more intensified and equitable systems**.



## WP 3: Co-design MFS with validated and evidence-based SI innovation bundles

This work package focuses on **the participatory design, implementation, reflection and monitoring** of approaches and interventions for SI of MFS in specific contexts.



## WP 4: Advancing and supporting scaling of innovations

This WP seeks to **enhance the necessary enabling environment** for the scaling of technical and institutional arrangements for SI of MFS.



## WP 5: Capacity building for systems design and analyses

This WP **builds capacity** of MFS actors in socio-technical, inclusive, participatory, and gender-transformative approaches for systems design and analyses.

## Selection of countries

Based on importance and representativity of MFS, demography and socioeconomic variables, as well as donor interest, previous investments and synergies with other initiatives



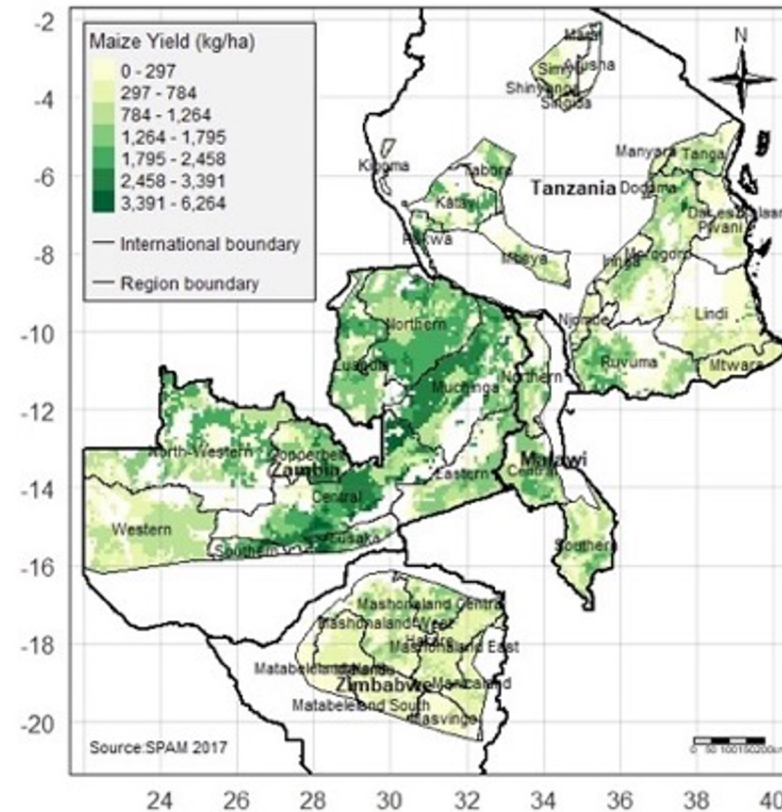
## Example: Maize mixed systems in ESA

- ca. 55 million people
- ca. 1.2 million ha of maize
- Large maize yield variability, from few hundred kilos up to three tons per ha
- ca. 0.4 - 0.6 TLU/ha
- Large variability on stocking rates

Implementation country:

### Malawi

- 82% of the population rural, agriculture 26% of GDP
- 80% population with food insecurity, 40 % of children under five with stunting



Donor interests, previous investments (e.g. Africa RISING, SIMLESA) and synergies with WP1 (Diversification) of RII-ESA.

# Past CGIAR research with high potential for impact in the short to medium term

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- (i) **Africa RISING** in 6 countries in SSA since ~10 years (IITA, ILRI, IFPRI, CIMMYT, IWMI, Alliance Bioversity-CIAT, ICRISAT, ICRAF, WorldVeg)
- (i) **CSISA** in 3 countries in South Asia since ~12 years (CIMMYT, IRRI, IWMI, IFPRI)
- (i) **SIMLEZA-Africa RISING** in Zambia for ~7 years (CIMMYT, IITA)
- (i) **SIMLESA** (maize-legume systems only) in 5 countries in east and southern Africa for 8 years (CIMMYT, ILRI, CIAT)
- (i) **Sustainable Intensification Innovation Lab** at KSU in 7 countries in SSA and SA since ~7 years with CGIAR involvement
- (i) Other Innovation Labs e.g., **Small-scale Irrigation** and **Legume systems** with CGIAR involvement

# Innovation

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Implementation of activities in each type of MFS (i.e. maize mixed ESA, upland mixed SEA, etc. ) through partnerships and based on locally relevant and demand driven **Innovation Bundles**

- **Hardware (Technologies and practices):** Sustainable Intensification practices for MFS (e.g. Innovative crop sequencing, Improved forages, Multipurpose crop and tree combinations, Integrated Livestock Feed Intensification,...) and **systems approaches, methods and tools** for ex-post/ex-ante multi-criteria and trade-off analysis and targeting (e.g. Sustainable Intensification Assessment Framework (SIAF), Evidence Generation for SI (RHoMIS),...)
- **Orgware (Policy and institutional innovations):** Socio-technical innovations for the SI of MFS (e.g., Collective leadership for sustainable and equitable MFS, Game changer for digital transformation of agriculture (MWANGA), Agricultural Mechanization through Group Business Model,...)
- **Software (Capacity):** Strategy for **Capacity building** towards SI of MFS (i.e., Guidelines for gender-responsive communication in A4D, Gender training manual: farming systems and action research, Extension and training materials supporting SI, Curricula for academic and non-academic training institutions, ...)



## What's new?

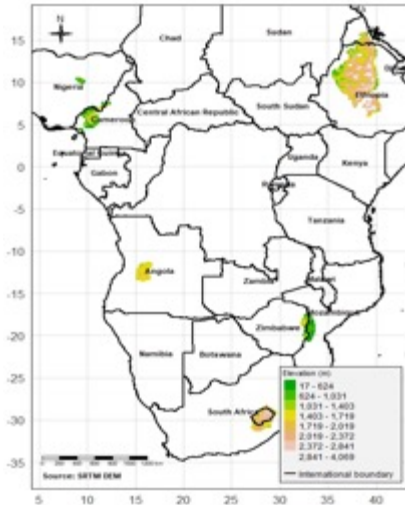
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1. **Systems-based targeting** of SI practices for the diversity of MFS in a range of agro-ecological and socio-economic settings
2. **Socio-technical innovation bundles**, co-design and scaling pathways for SI of MFS
3. **Robust and flexible systems approaches and methodologies** for ex-post and ex-ante assessment of SI options within MFS
4. **Cross regional learning and South-South collaboration** for systems analysis of MFS and their potential for SI
5. **Institutionalization of a systems approach** through generation of knowledge and evidence needed by decision-makers and capacity development

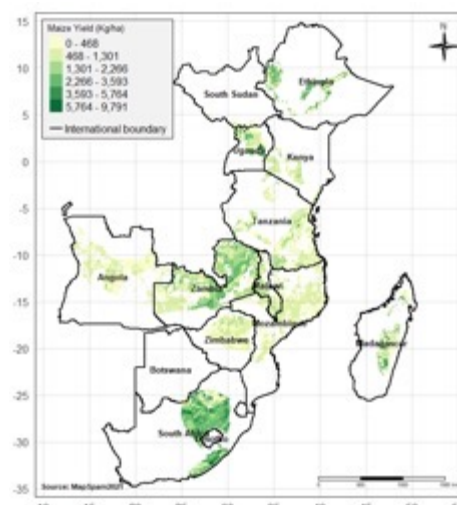
# Inter-initiative interactions

## Regional Integrated Initiatives (RII)

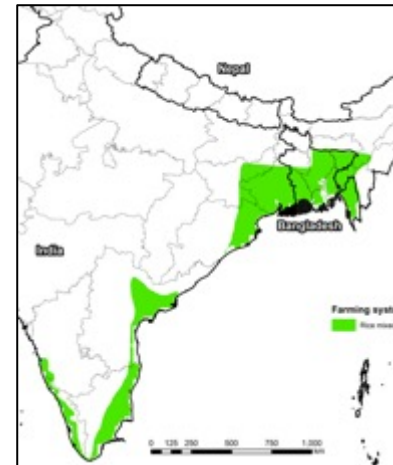
**U2**  
Highland mixed (Ethiopia)



**U2**  
Maize-mixed (Malawi)



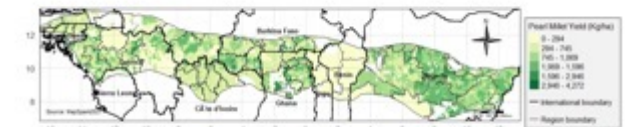
**TAFSSA**  
Rice-mixed (Bangladesh)



**TAFSSA**  
Highland mixed (Nepal)



**CWA**  
Cereal-root mixed (Ghana)



### RIIs provide:

- Context, demand and on-ground support for the SI of MFS
- Support for spill-over countries

### SI-MFS provides:

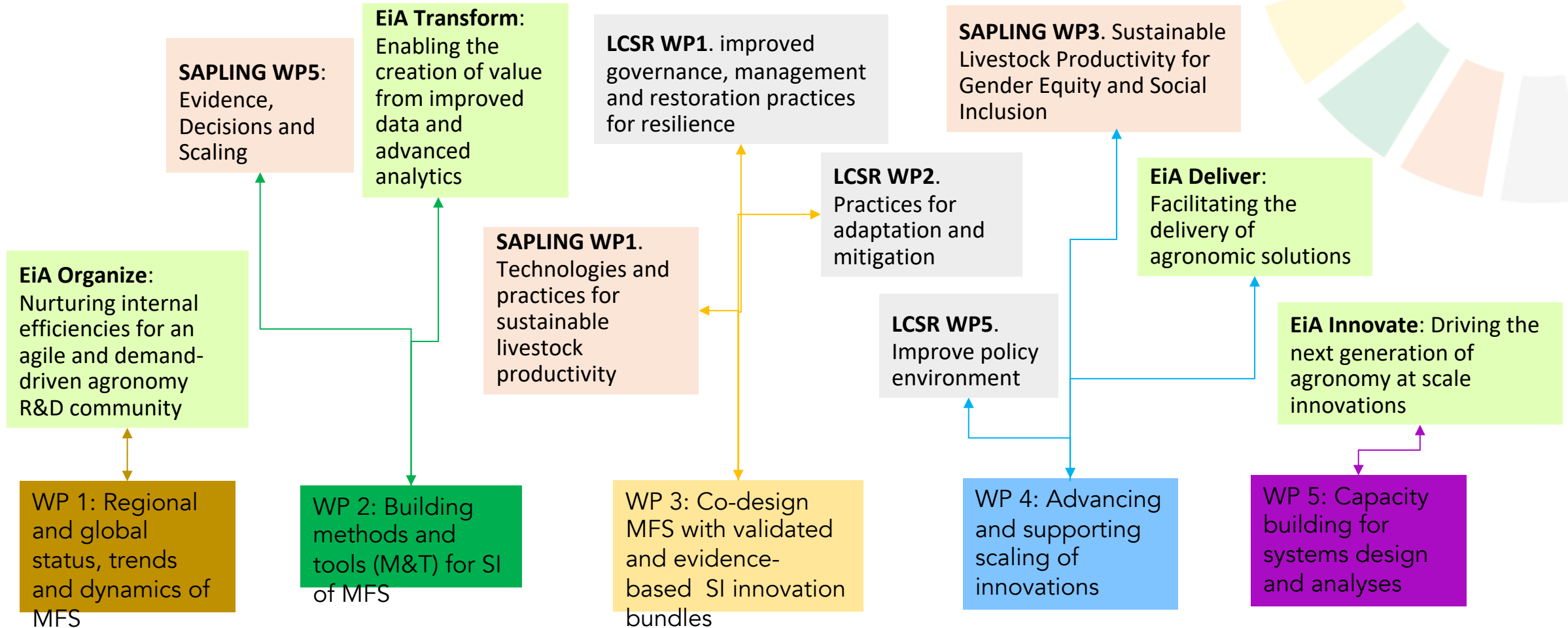
- Regional status, trends and entry points for SI of MFS (WP1)
- Approaches, methodologies and tools for SI of MFS (WP2)
- Support in co-design and scaling options for SI of MFS (WP3 and WP4)
- Capacity development for systems analysis and SI of MFS (WP5)

# Inter-initiative interactions Global Thematic Initiatives (RAFS)

SAPLING

EiA

LCSR



Sustainable Intensification of Mixed Farming Systems  
(SI-MFS)

# Inter-initiative interactions

## Global Thematic Initiatives (RAFS)



SAPLING

EiA

LCSR

Plant  
Health

Other  
(RAFS, ST)

### Global thematic initiatives:

- Provide disciplinary data, knowledge and evidence of SI options for MFS
- Support on-ground activities on co-design of sustainably intensified MFS
- Co-develop scaling pathways and enabling environment for SI of MFS

### SI-MFS initiative:

- Contextualization of disciplinary innovations within MFS
- Approaches, methodologies and tools for SI of MFS
- Co-design and scaling options for SI of MFS
- Capacity development for systems analysis and SI of MFS

### Geographic co-location with SI-MFS

Plant  
Health

All countries except  
Laos

LCSR

Ethiopia (Malawi and  
Ghana post 2024)

EiA

Ghana, Ethiopia,  
Malawi

SAPLING

Ethiopia and Nepal

## Sustainable Intensification of Mixed Farming Systems (SI-MFS)

WP 1: Regional  
and global  
status, trends  
and dynamics of  
MFS

WP 2: Building  
methods and  
tools (M&T) for SI  
of MFS

WP 3: Co-design  
MFS with validated  
and evidence-  
based SI innovation  
bundles

WP 4: Advancing  
and supporting  
scaling of  
innovations

WP 5: Capacity  
building for  
systems design  
and analyses

# Thank You

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